DOCUMENT RESUME

ED 097 570 CE 002 352

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TITLE Electric Calculators; Business Education: 7718.06.
INSTITUTION Dade County Public Schools, Miami, Fla.
PUB DATE 72
NOTE 30p.; An Authorized Course of Instruction for the Quinmester Program; photocopied from best copy available

EDRS PRICE MF-$0.75 HC-$1.85 PLUS POSTAGE
DESCRIPTORS Behavioral Objectives; *Business Education; Calculation; Course Content; Course Descriptions; Curriculum Guides; Education; *Electronic Equipment; Evaluation Methods; *Office Machines; *Office Occupations; Secondary Grades
IDENTIFIERS Electric Calculators; *Quinmester Program

ABSTRACT

The course was developed to instruct students in the use of mechanical and/or electronic printing calculators, electronic display calculators, and rotary calculators to solve special business problems with occupational proficiency. Included in the document are a list of performance objectives, a course content outline, suggested learning procedures and activities, evaluative instruments used, and resources for students and teachers. Appended is a Quinmester pre-test. (Author/BP)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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ELECTRIC CALCULATORS

Business Education—7718.06 and 5283.27 (New: 7743.06 and 7637.27)

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DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

ELECTRIC CALCULATORS

7718.06 and 5283.27 (New: 7743.06 and 7637.27)

Business Education

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Written by Jane McShane
And Approved by the Business Education Steering Committee
For Quinmester Courses

for the

DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, FL 33132
1972

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I. COURSE TITLE—ELECTRIC CALCULATORS

II. COURSE NUMBERS—7713.06 and 5233.27 (New: 7743.06 and 7637.27)

III. COURSE DESCRIPTION

A. Synopsis
Students will use mechanical and/or electronic printing calculators, electronic display calculators, and rotary calculators (if available) to solve special business problems with occupational proficiency.

B. Occupational Relationships

Accountant	Insurance clerk
Audit clerk	Calculating machine operator
Bookkeeper	General office clerk
Cashier	Statistical clerk
Payroll clerk	Shipping and receiving clerk
Billing clerk	Purchasing clerk
Recordkeeper	Credit clerk
Researcher	Order clerk

C. Vocational Scheme
Develops an occupational proficiency in the use of electric calculators for initial job placement. Although rotary calculators are rapidly becoming obsolete, many offices still have one or more machines. School models of electronic calculators are basic but have sufficient features to enable quick on-the-job adaptation to any advanced model.

IV. COURSE ENROLLMENT GUIDELINES

A. Prior Experiences Needed
The student should have attained the objectives of Preview of Computational Machines prior to enrollment in this course.

B. Pretest
The sample pretest which is located in the Appendix is made up of two parts. Part I is based on the skills the student is to have attained at the completion of the course, Preview of Computational Machines; Part II is based on the objectives to be reached at the end of this course. No grade should be recorded for this test.

The student must perform satisfactorily and with proper techniques the Part I section of whatever machine he is assigned. Should the student complete Part II satisfactorily, he may elect to enroll in another course.

C. Rational
The students selecting this course should be aware that more than 45 hours may be necessary in order to become an expert operator of this machine. Additional skills may be obtained by practicing in after-school hours or by enrolling in adult education classes.

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V. COURSE OF STUDY PERFORMANCE OBJECTIVES

Upon successful completion of the course, the student will be able to—

1. read figures as units or amounts rather than individual digits;
2. enter figures on the calculator keyboard rapidly, accurately, and with a minimum of effort using proper fingering patterns;
3. read and record machine-produced results accurately;
4. locate errors and make necessary corrections without help from the instructor;
5. maintain the printing calculator in good operating order by keeping it clean and changing tapes and ribbons correctly;
6. add on an electric calculator 12 given three-digit numbers with 100 percent accuracy in 45 seconds;
7. add on an electric calculator a mixture of 12 numbers containing up to 6 digits with 100 percent accuracy in 1 minute;
8. divide on an electric calculator with 80 percent accuracy in 3 minutes 5 given problems with up to 5 digits in the divisor and up to 7 digits in the dividend;
9. multiply on an electric calculator with 90 percent accuracy in 3 minutes, 10 given problems with up to 5 digits in the multiplier and up to 7 digits in the multiplicand;
10. perform on the electric calculator with 90 percent accuracy in 5 minutes, 10 given subtraction problems with up to 4 digits in the subtrahend and 5 digits in the minuend; and
11. complete various business problems that include distribution of overhead, statements, invoices, payroll, interest, discount equivalents, sales, and averages with a minimum of 80 percent accuracy.

VI. COURSE CONTENT

A. Equipment and Supplies
   1. Basic
      a. Electric calculators (printing, display, and rotary)
      b. Manufacturer's manuals identifying parts
      c. Textbook
      d. Workbook or supply of business forms
      e. Answer sheets
      f. Timer or clock
      g. Machine desk and chair

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2. Supplementary
   a. Decimal equivalent chart
   b. Chain discount chart
   c. Reciprocal chart
   d. Current Employer's Tax Guide

B. Pre-Operational Activities
   1. Review characteristics of calculators
      (Originally presented in Preview of Computational Machines)
      a. Rotary calculator
         (1) Carriage
            (a) Long row of dials
               (i) Sum in addition
               (ii) Difference in subtraction
               (iii) Product in multiplication
               (iv) Remainder in division
            (b) Short row of dials
               (i) Multiplier in multiplication
               (ii) Quotient in division
            (c) Keyboard dial (if on a machine) shows factor on keyboard
            (d) Decimal pointers
            (e) Dial locks
            (f) Tabulator stops
         (2) Keyboard
            (a) Different colored columns
            (b) Correct fingering technique
            (c) Individual column correction keys
            (d) Decimal markers
            (e) Master clearance key
            (f) Keyboard lock
         (3) Special purpose parts or keys
            (a) Repeat key
            (b) Keyboard clear key
            (c) Carriage clear key
            (d) Carriage shift keys
            (e) Divide stop
            (f) Other parts pertinent to model being used
      b. Printing calculator
         (1) Symbols on tape for machine being used (see Appendix)
         (2) Capacity
         (3) Keyboard
            (a) 10-key numeric keyboard
            (b) Feel of home row
            (c) Zero operation (single, double, triple)
         (4) Special function keys
            (a) Multiplication
            (b) Division
            (c) Non-add
            (d) Repeat

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(e) Sub-total
(f) Total
(g) Decimal (on electronic)
(h) Total transfer
(i) Constant lever (on mechanical)
(j) Master control lever (on mechanical)
(k) Memory (on electronic)
(l) Storage (on electronic)
(m) Other specialized keys

(5) Decimal pointers or controls
(6) Digit indicator (on mechanical)
(7) Power switch (on electronic)

c. Electronic display calculator

(1) Answer display dial
(a) Capacity
(b) Clearance
(c) Overflow indicator

(2) Functional keys
(a) Decimal point control and/or decimal point key
(b) Memory input
(c) Accumulator
(d) Clearance
(i) Display
(ii) Registers
(iii) Reset
(e) Addition
(f) Subtraction
(g) Multiplication (positive and negative)
(h) Division
(i) Result
(j) Memory recall
(k) Display interchange key
(l) Multiple register
(i) Operation
(ii) Accumulation
(m) Constant
(n) Round off control if present
(o) Power switch and indicator

(3) Other keyboard characteristics
(a) Ten-key numeric keyboard
(b) Location of zero
(c) Additional keys on certain machines

2. Preparing machine for operation

a. Rotary Calculator

(1) Clear short and long rows of dials
(2) Clear keyboard
(3) Shift carriage to extreme left
(4) Release repeat key
(5) Set counter control in normal position
(6) Set pointers in dials for any decimals or commas needed

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b. Printing calculator
   (1) Check tape supply and replace if necessary
   (2) Turn on power (electronic)
   (3) Clear machine keyboard, memory, and storage
   (4) Check tape for total symbol
   (5) Release all functional keys

c. Electronic display calculator
   (1) Turn on power
   (2) Clear display
   (3) Clear keyboard register or depress reset key
   (4) Clear memory and storage units and round off control (if present)
   (5) Set decimal control

C. Operating Techniques
1. Desk arrangement
   a. Placement of machine
   b. Placement of book or other source materials
   c. Placement of answer sheet
2. Each number or amount is read as a unit rather than as individual digits
3. Decimal pointers
   a. Rotary calculator
      (1) Set pointers on carriage and markers on keyboard before starting the problem
      (2) Enter numerals around present decimals
   b. Printing calculator
      (1) Set decimal indicators before entering problem
      (2) Mark decimal points on tape immediately after completing problem, if they are not automatically printed correctly
   c. Electronic display calculators
      (1) Set control and round off mechanism for desired number of places in answer
      (2) Enter decimal when writing numeral on machine
      (3) Correct decimal appears automatically in answer
4. Checking for accuracy
   a. Listing machines—check tape against original figures
   b. Non-listing machines—complete problem a second time
5. Keyboard operation
   a. Rotary calculator
      (1) Simultaneous depression of keys when setting number on keyboard using correct fingering patterns
      (2) Fingers hover in area of 5 keys
      (3) Small finger extends toward motor bar
   b. Printing calculator
      (1) Touch control (10-key adding machine method)
      (2) Immediate return to home keys after depressing numbers to be written

c. Electronic display calculator
(1) Touch control (10-key adding machine method)
(2) Immediate return to home keys after depressing numbers to be written
(3) Decimal point must be keyed-in at its proper place within a number

D. Arithmetical Operations
1. Addition
a. Technique review
(1) Fingering 2-, 3-, 4-, 5-digit numbers
(2) Zeros in addends
(3) Use of repeat key
(4) Correcting errors
(5) Non-add key
(6) Decimals and whole numbers
(7) Sub-totals
(8) Grand total
b. Business applications
(1) Sales slips
(2) Petty cash book
(3) Sales summaries
(4) Journal entries (columnar)
2. Subtraction
a. Technique review
(1) Positive and negative answers
(2) Correcting errors
(3) Fractions and decimals
b. Business applications
(1) Ledger accounts
(2) Profit and loss statement
(3) Bank reconciliation
3. Multiplication
a. Technique review
(1) Setting decimals
(2) Decimal equivalents of fractions
(3) Rounding off
(4) Special unit prices—C, M, CWT
(5) Fixed decimal points
(6) Accumulation of products
(7) Use of constants
(8) Chain multiplication
(9) Negative multiplication
b. Business applications
(1) Inventory records
(2) Invoice extensions and discounts
(3) Verification of invoices
(4) Insurance premium costs

VI. COURSE CONTENT, Continued

4. Division
   a. Technique review
      (1) Division of decimals and fractions
      (2) Remainder expressed as decimal
      (3) Rotary calculator
         (a) Fixed decimals on automatic machine
         (b) Alignment on non-automatic machine
         (c) Division stop keys
      (4) Printing calculator
         (a) Setting decimal in quotient
         (b) Constants
      (5) Electronic display calculator
         (a) Constant dividend
         (b) Constant divisor
         (c) Exceeding capacity
   b. Business applications
      (1) Averages
      (2) Inventory turnover
      (3) Conversion of units on invoices
5. Percents
   a. Fundamental operations
      (1) Cash discount
      (2) Trade discount
      (3) Net amounts
      (4) Simultaneous net amount and discount
      (5) Simultaneous cost and selling price
      (6) Commissions
      (7) Markups and markdowns
      (8) Percentage of increase or decrease
      (9) Percent one number is of another
   b. Business applications
      (1) Invoices with discount
      (2) Salesman's commission statement
      (3) Sales analysis reports
      (4) Sales comparisons
      (5) Cost analyses
      (6) Inventory involving pricing and markup and markdown operations
6. Series discounts
   a. Fundamental operations
      (1) With net equivalent table
      (2) Without table
         (a) As separate net amounts
         (b) Use of complements to find equivalents
   b. Business applications
      (1) Invoices with various types of discount
      (2) Accounts payable
7. Payrolls
   a. Types
      (1) Straight salary

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(2) Piecework
(3) Hourly pay—straight and overtime
(4) Commissions

b. Fundamental knowledge
(1) Definition of terms
(2) Directions for finding net pay
(3) Determining withholding tax and social security tax

c. Business applications
Complete the four types of payrolls

E. Care of Machines
1. Cleaning
2. Changing tapes (on printing calculators)
3. Changing ribbons (on printing calculators)

VII. SUGGESTED PROCEDURES, STRATEGIES AND LEARNING ACTIVITIES

A. Suggested Teaching Methods

The ideal way to introduce the operation of electric calculators is by the battery method. Through this method not only the "hows" but the "whys" of the procedures involved may be presented at the same time. Because some students are more advanced than others at the completion of Preview of Computational Machines, it is desirable that the teacher set up a machine rotation method of instruction and depend on self-instructional manuals to supplement presentations.

The rotation plan adopted will depend on the size of the class, the skills of the students, and the number of machines available. However, a plan allowing approximately 3 weeks for each type of calculator would probably be most satisfactory during this quinmester.

After learning the fundamentals of operating the calculator, the student's learning should be reinforced by completing the business forms assigned by the teacher. These practice problems add a valuable experience factor to the student's background since they present the basic business forms that require machine calculations and are universal in business offices.

The teacher should conduct the class on a person-to-person basis. He should circulate through the room constantly, noting weaknesses of each student and prescribing special drills, exercises, and activities to compensate for revealed inadequacies.

The student should be supplied with the answers to all problems so that an immediate check on the accuracy of his work is available. By comparing his work with the printed answers, the student knows immediately whether or not he is learning the new

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material correctly, recognizes the type of error he is making such as faulty decimal placement, carelessness, misunderstanding of theory, etc.

He should also be supplied with the business forms needed to complete the application portion of his learning. A commercially prepared workbook, a teacher duplicated supply of various forms, or a textbook with a supply of the necessary business papers is a necessity in this course.

The student should also have copies of the charts mentioned under supplementary supplies. The current Employer's Tax Guide from the IRS may be used to provide current tax deductions for payroll problems.

B. Special Activities

Throughout the course, the teacher should attempt to use special activities to avoid monotony and increase the interest of the students. Some suggestions follow:

ACTIVITY	PROCEDURE
1. Invoice Extensions	A copy of the department order for supplies can be given to the student for completion of the extensions and additions.
2. Other Class Projects	Students should be encouraged to check or complete bookkeeping or other related class assignments when they can be solved with the aid of an electric calculator.
3. Number Reading	Speed in reading numbers can be developed and/or improved with the use of a set of flashcards, acetates for an overhead projector, or paced filmstrips (EDL). Decimal points in various positions should be included. The student sees the number and writes it from memory on a piece of paper. The numbers can get progressively longer as proficiency in this skill develops.
4. Daily Warmups	A short opening drill completed by all students will serve the function of starting the day's work promptly, developing proper work habits, and

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	developing appropriate skills and techniques. The problems chosen should be relatively short so that they can be completed quickly; should proceed from simple to complex; and should deal with manipulation techniques only. Periodically, these drills should be examined and/or graded by the teacher.
5. Payroll	A time card is provided for each student for each week of the course. The student signs in on the time card every day he is present. A basic rate is "earned" for the assigned work performed during the class period. After completing the minimum assignment, any additional work is "paid" at an overtime rate, with the teacher's approval. At the end of the week, the payroll is retained for future use or is computed as part of the payroll unit assignment. This can also be used for bonus points in figuring the grade.
6. Bulletin Board	A student or committee can earn overtime pay for developing a bulletin board pertinent to class activities.
7. Office Manager	Students who have completed their assignments can be enlisted or earn overtime pay as teacher assistants to help other students. Clerical duties such as checking the roll or time cards, distributing papers, checking the machines, and many other matters can be handled by such a student.

VIII. EVALUATIVE METHODS

There are several methods of measuring achievement in calculator operation. Some of these methods may be combined to develop a grading system that is appropriate for the level of the class and the model of the machine. Suggestions follow for grading arithmetic drills or technique development in the application of learnings to business forms, and for measuring understandings of machine operation and arithmetic theory.

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VIII. EVALUATIVE METHODS, Continued

A. Arithmetic Drills and Procedures

1. Problems involving operations currently and previously taught and reflecting a balance of digits from 0-9 and a uniform mixture of 2-5 digit numbers should be used in evaluation.

2. Accuracy standards
   a. Number of correct answers
   b. Number of correct answers as a percent of the number of problems completed
   c. Number of correct answers as a percent of the number of problems assigned

3. Time standards
   a. Number of problems completed
   b. Students ranked on the basis of time as they complete the assignment
   c. Time limit (for example, 20 minutes) set by the instructor, based on previous experience with similar students and machines. Example:

Time with 100% accuracy

Minutes	Grade
9	A+
10	A
11	A-
12	B+
13	B
14	B-
15	C+
16	C
17	C-
18	D+
19	D
20	D-
21	F

   d. Number of strokes completed during the time limit (a method for counting strokes is given in part E of this section)
   e. Gross strokes a minute
   f. A predetermined grading scale based on previous experience or on performance of other members of the class (This may necessitate the teacher keeping a record of the performance of a number of students before assigning grade values.)

4. Combination of accuracy and time standards
   a. Net strokes a minute
   b. Assignment of two grades: one for accuracy, the other for time

VIII. EVALUATIVE METHODS, Continued

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5. Method for counting strokes or digits

Addition

1. Count all digits in the number.
2. Count all figures as digits even though depressed simultaneously with one motion as on the rotary calculator.
   123.4 counts as 4 digits on the rotary calculator and normally on the printing calculator but 5 digits if it is necessary to touch the decimal key as on the electronic display calculator.
3. Count zeros as digits whether depressed or not.
4. Keys to clear the keyboard, plus or minus bars, or motor bars are not included in the digit count.

Subtraction

1. Digits counted the same as in addition.
2. If the result is a credit balance on a machine not listing a credit balance automatically, count digits as you would in addition and add the number of digits in the complement including 9's.

   Example: 1362.71 = 6 digits
   - 3246.50 = 6 digits
   998116.21 = 8 digits, total 20 digits

Multiplication as shown:

1234 x 361 = 7 digits
123 x 306 = 6 digits

Division as shown:

4603 ÷ 123 = 7 digits
845 ÷ 604 = 6 digits

Note: Except for addition, problems not completed are ignored in the stroke count.

6. Suggested Grading Scale for Rotary Calculator*

Vocational Level

Digits per Minute			Number of Errors				
Slow	Average	Superior	0	1	2	3	4+
177-180	197-200	217-220	A+	A	B+	B	Repeat
173-176	193-196	213-216	A	B+	B	C+	Repeat
169-172	189-192	209-212	B+	B	C+	C	Repeat
165-168	185-188	205-208	B	C+	C	D+	Repeat
161-164	181-184	201-204	C+	C	D+	D	Repeat

VIII. EVALUATIVE METHODS, Continued

Semi-Skilled Level

Digits per Minute			Number of Errors				
Slow	Average	Superior	0	1	2	3	4+
117-120	137-140	157-160	A+	A	B+	B	Repeat
113-116	133-136	153-156	A	B+	B	C+	Repeat
109-112	129-132	149-152	B+	B	C+	C	Repeat
105-108	125-128	145-148	B	C+	C	D+	Repeat
101-104	121-124	141-144	C+	C	D+	D	Repeat

*Agnew, Peter L. and Cornelia, Nicholas J. MANUAL FOR OFFICE MACHINES COURSE. 3rd ed. Cincinnati: South-Western Publishing Co., 1962.

B. Business Forms

1. The application of techniques and understandings of mathematical principles to business forms should be included on every test.
2. Standards for handling business forms should be based primarily on accuracy rather than speed.
3. The forms should be similar to those used in learning activities.

C. Theory Review

1. Several questions, statements, or a review of mathematical principles should also be included on every test.
2. Responses are not to be solved on the calculator, but are intended to measure the student's understanding of the operation of a particular machine, the placement of decimals, etc.
3. Different forms of the same type of questions might be used in repeated testing of the same or different machines.
4. Examples of theory are located in the Appendix.

IX. RESOURCES FOR STUDENTS

A. Books

Agnew, Peter and Pasewark, William R. Rotary Calculator Course, 4th ed. Cincinnati: South-Western Publishing Co., 1963.

Automatic Printing Calculator. Chicago: Victor Comptometer Corp., 1965.

Business Mathematics. Orange, N. J.: Monroe Calculator Co., 1963.

IX. RESOURCES FOR STUDENTS, Continued

A. Books, Continued

Cornelia, Nicholas; Pasewark, William R.; and Agnew, Peter. Office Machines Course, 4th ed. Cincinnati: South-Western Publishing Co., 1971.

Divisumma 24. New York: Olivetti Underwood Corp. 1963.

Fasnacht, Harold; Bauernfeind, Harry; and Vigen, Donald. How To Use Business Machines, 3rd ed. New York: Gregg Division of McGraw-Hill Book Co. 1969.

Meehan, James. Using the Rotary Calculator in the Modern Office. New York: Gregg Division of McGraw-Hill Book Co. 1965.

Pactor, Paul and Johnson, Nina M. Comprehensive Business Machines Course. New York: Pitman Publishing Co. 1968.

Pactor, Paul and Johnson, Nina M. Rotary Calculator Course, 3rd ed. New York: Pitman Publishing Co. 1968.

Pactor, Paul. Printing Calculator Course. New York: Pitman Publishing Co. 1969.

Romey, Kenneth and Anderson, Yvonne. Business Machines, 4th ed. Dubuque, Iowa: William Brown Company. 1970.

Walker, Arthur; Roach, J. Kenneth; and Hanna, J. Marshall. How to Use Adding and Calculating Machines, 3rd ed. New York: Gregg Division of McGraw-Hill Book Co. 1967.

B. Projects

Cornelia, Nicholas and Agnew, Peter. Machine Office Practice, 2nd ed. Cincinnati: South-Western Publishing Co., 1971.

Pactor, Paul. Business Machines Projects. New York: Pitman Publishing Co. 1960.

Lee, D. E. Business Machines Practice Set. New York: Gregg Division of McGraw-Hill Book Co. 1971.

C. Audio Tapes

Hempel, Marvin; Salser, Carl; and Butsch, Charlotte. Educational Research Associates, 1970.
ROTARY CALCULATOR, 7 tapes, 14 lessons, and student guide
PRINTING CALCULATOR, 3 tapes, 6 lessons, and student guide
ELECTRONIC CALCULATOR, 3 tapes, 6 lessons, and student guide

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IX. RESOURCES FOR STUDENTS, Continued

D. Filmstrips

Calculation Instruments, Society for Visual Education.

X. RESOURCES FOR TEACHERS

A. Manuals and Keys

Manuals and keys are available from the publishers for all textbooks listed under "Resources for Students."

B. Periodicals

Balance Sheet, The. Cincinnati: South-Western Publishing Company. Monthly.

Business Education World. New York: Gregg Division of McGraw-Hill Book Co. issues yearly.

Journal of Business Education. Wilkes-Barre: Robert C. Trethaway. Monthly, October through May.

APPENDIX

ELECTRIC CALCULATORS

PRETEST

Part I

Directions:
1. Show all answers with commas and decimals correctly placed.
2. Attach your tape to the test sheet.
3. Round off all products and quotients to 2 decimal places.

.39	6.09	.10	.10	1.60	6.34
14.40	.63	5.74	5.74	1.60	6.34
.97	1.84-	9.12	9.12	1.60	6.34
568.41-	48.31	7.50	7.50	.05	6.33
7.40	141.49-	.74	.74	.05	1.40
35.94	.30	9.39	9.39	.05	1.42
.24-	90.98	(3) S	(7) S	.05	1.41
1.53-	7.22	5.80	8.82	.05	.07
550.03	8.23	2.78	10.99	681.55	.08
93.38	.70-	9.74	58.80	681.55	.07
12.25	562.68	4.35	2.80	681.55	.05
182.66-	587.88-	3.01	7.08	17.62	49.65
.67	4.08	.59	(8) S	17.62	49.65
6.70	.73	(4) S	30.90	17.62	49.55
.08	65.91	20.80	2.22	8.65	49.54
7.14-	5.32	97.50	3.37	8.65	.42
.79	4.27-	.89	64.00	8.65	.42
7.19	.05	6.13	88.30	8.65	.42
51.43	17.41	(5) S	.97	8.65	.42
.10	2.50	.19	(9) S	8.65	1.71
(1)	(2)	77.00	7.44	.70	1.71
		4.20	5.67	.70	1.71
		.38	9.96	.70	1.71
		2.46	.45	.70	1.70
		3.38	4.98	.70	1.70
		(6) T	(10) T	(11)	(12)

Multiply:
(13) 157 x 861 =
(14) 386 x 302 1/8 =
(15) 65 1/4 x 38 3/5 =

Divide:
(16) 3,189 divided by 41 =
(17) 44.234 divided by 2.43 =
(18) 785.7 divided by 12.6 =

Subtract:
(19) 27 − 6.481
(20) 472 − 3.748

Answers
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Part II

A. Directions: Complete extensions and find grand total of 1-4:

Quantity	Description	Unit Price		
3 1/2 doz.	Mittens	$12.88 doz.	1.	_____
8 1/4 doz.	Gloves	$12.84 doz.	2.	_____
750	Invoice forms	$ 7.22 C	3.	_____
2500	Printed forms	$12.14 M	4.	_____
		Grand Total	5.	_____
7 pcs. @ 35 1/4 yd.	Celanese red	$ .49 yd.	6.	_____
5 pcs. @ 13 yd.	Novelty brown	$ 1.63 yd.	7.	_____

B. Directions: Round off to the nearest cent and find the amount of discount and the net amount.

$ 605.75 less 37 1/2%	Discount	8.	_____
	Net amount	9.	_____
$4,321.35 less 16 2/3%	Discount	10.	_____
	Net amount	11.	_____
$ 876.49 less 25% - 10% - 5% (use table)	Net amount	12.	_____
$ 678.92 less 10% - 10% - 10% (use table)	Net amount	13.	_____

C. Directions: Find the interest:

$5,810 at 6 1/2% for 17 days	Interest	14.	_____
$ 610 at 4% for 60 days	Interest	15.	_____

D. Directions: Find the percentage of increase or decrease:

Last week $630 This week $960	Amount of inc.	16.	_____
	% of increase	17.	_____
Last week $406 This week $729	Amount of inc.	18.	_____
	% of increase	19.	_____

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Part II, Continued

E. Directions: Distribute overhead of $6,800 to each of 5 departments on the basis of sales:

Dept.	Sales	Percentage	Amount Charged Each Dept.
A	$ 2,400	20. _____	21. _____
B	4,540	22. _____	23. _____
C	16,500	24. _____	25. _____
D	2,160	26. _____	27. _____
E	7,900	28. _____	29. _____
Totals	30. _____	100%	$6,800

F. Miscellaneous

Find equivalent net discounts of

12% - 10% 31. _____

20% - 12 1/2% - 10% 32. _____

What % of 692.48 is 9.27? 33. _____

What % of 154.91 is 37.62? 34. _____

40 oz. @ $2.48 equals 35. _____

198 inches @ $1.12 foot equals 36. _____

An item costing $12.25 is to be marked up 40%
What is the selling price? 37. _____

A coat costing $12.50 is to be marked up 30%
The selling price will be 38. _____

Average: 10, 78, 45, 123, 91, 63 39. _____

G. Complete a payroll form of the teacher's choice.

SUGGESTED PRETEST, Continued

Part III

A. Directions: Add on an electric calculator within 45 seconds the following list of numbers, and write the answers on your paper. Ask your teacher to observe your fingering techniques.

831
312
765
789
984
234
551
421
367
398
345
462

B. Directions: Add on an electric calculator within 1 minute the following list of numbers, and write the answers on your paper.

4,591
769
324,781
98
3,712
84,914
6,023
57
81
417
789,533
8,721

C. Directions: Perform on an electric calculator within 3 minutes the following division problems, and write the answers on your paper. Round off the answers to three decimal places.

1. 654 ÷ 47 =
2. 725 ÷ 341 =
3. 8,611.643 ÷ 93 =
4. 1,328,514 ÷ 73,262 =
5. 81,627 ÷ 72.28 =

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Part III, Continued

D. Directions: Perform on an electric calculator within 3 minutes the following multiplication problems, and write the answers on your paper. Round off the answers to three decimal places.

1. 4,672 x 39	2. 4,615,437 x .472	3. 13,826 x 327	4. 89.65 x .38
5. 3,671.8 x 71.89	6. 468 x 729	7. 47,891 x 325	8. 62.734 x 4.15
9. 694.75 x 61.7	10. 14.681 x 374		

E. Directions: Perform on an electric calculator within 5 minutes the following subtraction problems, and write the answers on your paper.

1. 74,621 - 6,398	2. 17.647 - 6.84	3. 857 - 98	4. 7,661 - 77
5. 61,384 - 3,971	6. 8,217 - 6,435	7. 41.62 - 2.89	8. 673 - 38
9. 6,417 - 897	10. 680 - 297		

PRETEST KEY

Part I

1. 21.74
2. 84.26
3. 32.59
4. 58.86
5. 184.18
6. 271.79
7. 32.59
8. 121.08
9. 310.84
10. 339.34
11. 2,157.96
12. 240.16
13. 135,177
14. 116,620.25
15. 2,518.65
16. 77.78
17. 18.20
18. 62.36
19. 6,454 cr.
20. 3,276 cr.

Part II

1. $45.08
2. $105.93
3. $54.15
4. $30.35
5. $235.51
6. $120.91
7. $105.95
8. $227.16
9. $378.59
10. $720.23
11. $3,601.12
12. $562.05
13. $494.93
14. $17.83
15. $4.07
16. $330
17. 52.37
18. $323
19. 79.55
20. 7.16
21. $486.88
22. 13.55
23. $921.40
24. 49.26
25. $3,349.68
26. 6.45
27. $438.60
28. 23.58
29. $1,603.44
30. $33,500
31. .7920
32. .63
33. 1.34
34. 24.29
35. $6.20
36. $18.48
37. $20.42
38. $18.29
39. 68.33

Part III

A. 6,459

B. 1,223,697

C.
1. 13.915
2. 2.126
3. 92.598
4. 18.134
5. 1129.317

D.
1. 182,208
2. 2,178,486.264
3. 4,521,102
4. 34.067
5. 263,965.702
6. 345,852
7. 15,564,575
8. 260.3461
9. 42,866.075
10. 5,490.694

E.
1. 68,223
2. 10.807
3. 759
4. 7,584
5. 57,413
6. 1,782
7. 38.73
8. 635
9. 5,520
10. 383

PRINTING CALCULATORS

IDENTIFYING THE SYMBOL ON THE TAPE

The Symbol and Its Meaning	Olivetti	Victor	Monroe	Remington
Total or clearance of machine	T (red)	T	* (red)	* (red)
Addition	+			
Subtraction	-	-	- (red)	-
Sub-total	S (red)	S	◇ (red)	s (red)
Credit balance (minus result)	cT (red)	TC	*- (red)	*cr (red)
Credit balance, sub-total (minus result)	cS (red)	SC	◇- (red)	s cr (red)
Non-add	<	N	#	
Entry of multiplier	x<	X	X	V vertically on left side of tape
Entry of multiplicand	-	X	-	horizontally on left or right side
Multiplicand in negative multiplication	x̲	X,-	X-	
Reading the memory-memory out	x (red)			
Product re-entry by transfer	xT (red)	X,T	X	V
Transfer of register total	xT (red)	X,T	* (black)	
Transfer of sub-total	xS (red)	X,S	◇ (black)	
Transfer from memory back to register	x+ (red)			
Transfer from memory to register (subtraction)	x- (red)			
Simultaneous entry in register and memory (addition)	x+			
Simultaneous entry in register and memory (subtraction)	x-			
Dividend entry	+	+		
Proof of dividend entry	: (red)			
Divisor entry and division	:	+	:	divisor shown under dividend
Amount retained for accumulation			▽ (red)	
Automatic clearance of results	T (red)	T (black)	* (black)	* (red)
Quotient in division	T (red)	+	Q (red)	shown vertically on left side of tape
Remainder in division answer	T (red)	T	* (red)	* (red)

THEORY REVIEW

Directions: Write your answers on a sheet of paper.

1. The component parts of a number are called _____.

2. The first digit of a 3-digit number is entered with the _____ finger on a rotary calculator.

3. What key on the printing calculator will give a partial answer in addition?

4. What finger controls the 3 and 9 on a 10-key numerical keyboard?

5. Point off correctly in the answer:
   xx.x times x.xxx = xxxxxxx
   .xx times .xxxx = xxxxxx

6. Round off to 2 places properly: to 3 places properly:
   12.3456 =
   64.7345 =
   6.54789 =
   .123456 =

7. Point off decimals in the answer.

If unit price is	and quantity is		answer
.78 per C	785	=	xxxxx
1.05 per M	1872	=	xxxxx
2.735 per CWT	1234	=	xxxxxxx

8. How do you correct an error on the machine being used if discovered immediately upon entry on the keyboard? if discovered immediately after entry into a register? if discovered after the problem is completed?

9. In what position is the rotary calculator carriage located for addition?

10. State the number of decimals which should be set in the answer dials or marked on the tape for multiplying:
    (a) 33 x .06 ?
    (b) 6 1/4 x 3.15 ?
    (c) 23 1/8 x 1.245 ?

11. How many units are represented by the symbols M, C, CWT?
    How many units are represented by doz., gross, each?

12. When accumulating products with varying decimal places, it is most important that the problem be solved with a _____ decimal set up on the machine.

13. When dividing on a rotary calculator which does not have an automatic line-up feature, it is necessary to shift the carriage to the _____ before depressing the divide key.

14. The divisor must be lined up with the _____ before starting the division process.

15. Identify the following factors by name:

a.	A number in addition	_____
b.	68	_____
c.	-37	_____
d.	XX	_____
e.	115	_____
f.	x 78	_____
g.	XXX	_____
h.	144	_____
i.	÷ 12 =	_____
j.	XX	_____

16. a. If a number is left over in division, it is called a _____.
    b. Where does it appear on your machine?

17. Compensation for work performed can be figured several ways on payrolls. Name 3 of them:

_____

_____

_____

18. What is the current rate for employee deductions for social security taxes?

19. What 2 things must be known before income withholding tax can be computed?

20. The symbol % always indicates _____ decimal places.

21. Fill in the blanks:

	Fraction	Decimal	%
a., b.	1/4	_____	_____
c., d.	_____	_____	12.5
e., f.	4/5	_____	_____
g., h.	_____	.875	_____

THEORY REVIEW, Continued

22. Write the equivalents of the following numbers:

a. 15% = .
b. 125% = .
c. 4% = .
d. 3 1/2% = .
e. 1.367 = %
f. .634 = %
g. 6.12 = %